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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,450	02/20/2002	John S. Foong	4808	7381

7590

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Chief Patent Counsel
Engelhard Corporation
101 Wood Avenue
P.O. Box 770
Iselin, NJ 08830-0770

EXAMINER

ILDEBRANDO, CHRISTINA A

ART UNIT PAPER NUMBER

1725

DATE MAILED: 07/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/079,450

Applicant(s)

FOONG ET AL.

Examiner

Christina Ildebrando

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 17 is objected to because of the following informalities: "of about 0.2 about 20" should be "of about 0.2 to about 20". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 4-6, 8-11, 14-26, and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Lindner et al.

Lindner et al. (EP 0 885 650) discloses a catalyst composition useful in the purification of internal combustion engine exhaust gas. The catalyst composition comprises two catalytically active layers on a carrier structure, wherein the first layer applied to the carrier structure contains one or more finely divided solids, one or more highly dispersed alkaline earth metal oxides and at least one platinum group metal and the second layer contains finely divided solids and at least one platinum group metal as

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a three way catalyst (page 4, lines 32-35 and lines 45-51). Lindner et al. defines finely divided solids as powdered materials having a particle size of from 1-50 microns (page 2, lines 40-45).

Suitable alkaline earth metal oxides include magnesium oxide, barium oxide, and calcium oxide (page 5, lines 30-33). It is taught that amounts of 10-40 g/L (0.16-0.66 g/in³) of alkaline earth metal oxide are sufficient to stabilize the coating (page 6, lines 18-20). Palladium and optionally platinum are used as the platinum group metals in the first layer, while rhodium and optionally platinum are used as the platinum group metals in the second layer (page 5, lines 25-30). When both rhodium and platinum are used a weight ratio of platinum to rhodium of 3:1 to 1:3, preferably 1:1, are suitable (page 6, lines 34-39). This corresponds to a molar ratio in the range of 5.69 to 0.63 moles of platinum per mole of rhodium, preferably 1.9. It is taught that the platinum group metals in the second layer are preferably used at a concentration of 0.1 to 5wt% (concentration of the second layer is 40-150 g/L), which yields a loading of 0.04 g/L (1.13 g/ft³) – 7.5 g/L (212 g/ft³) (page 6, lines 18-20 and page 6, lines 30-35).

The finely divided solids consist of at least one finely divided oxygen storing material and at least one finely divided component (page 4, lines 30-59 and page 5, lines 1-5). It is taught that cerium oxide is used as the finely divided oxygen storing material in the first layer and a cerium-rich cerium-zirconium mixed oxide is used as the finely divided oxygen storage material in the second layer (page 5, lines 24-27).

Aluminum oxide is used as finely divided component in both layers (page 5, lines 24-

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27). The use of gamma alumina is exemplified (page 7). It is taught that the aluminum oxide is preferably stabilized with lanthanum oxide (page 5, lines 32-38).

With regards to the first layer, Lindner et al. teaches the platinum group metal, the alkaline earth metal oxide are deposited on the finely divided components and finely divided oxygen storage materials in the first layer (page 6, lines 42-46). In the second layer, the platinum group metals are deposited on only a part of the finely divided constituents, leaving a portion of the finely divided materials in bulk form (page 7, lines 10-20). The finely divided materials in bulk form are considered to meet the binder material instantly claimed.

With reference to example 5 (page 13), Linder et al. specifically teaches a catalyst composition having the following composition:

First layer:

La/Al₂O₃: 100 g/L

CeO₂/ZrO₂: 30 g/L

CeO₂: 30 g/L

ZrO₂: 30g/L

BaO: 20g/L (0.33 g/in³)

Pd: 2.5 g/L

Second layer:

La/Al₂O₃: 10 g/L

CeO₂/ZrO₂: 20g/L (30 wt% ZrO₂ yields 0.098 g/in³ ZrO₂)

Al₂O₃: 20 g/L (0.33 g/in³)

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Rh: 0.16 g/L (4.5 g/ft³)

Pt: 0.16 g/L (4.5 g/ft³)

It is taught that the La/Al₂O₃ is stabilized with 2-4% La₂O₃, which yields 0.0327 g/in³ – 0.0655 g/in³ of lanthanum oxide in the first layer (page 7, lines 45-48). Cordierite having a honeycomb structure is used as the carrier material (page 8, lines 10-15).

With regards to the second layer, rhodium and platinum are supported on the lanthanum stabilized alumina, while the alumina and cerium-zirconium oxide are present in bulk form, which is considered to meet the binder composition instantly claimed.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Lindner et al.

4. Claims 1-6, 8-9, 14-21, 23, 28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurokawa et al.

Kurokawa et al. (US 6,066,587) discloses a catalyst composition useful in the purification of exhaust gases from motor vehicles. The catalyst composition comprises a honeycomb carrier bearing two catalyst layers: a base catalyst layer containing platinum and an alkaline earth metal such as strontium or barium, and an over catalyst layer containing a zeolite, platinum and rhodium of a weight ratio greater than 0.3, which yields a platinum to rhodium molar ratio greater than 0.57 (column 3, lines 43-56). Refer also to Figs. 4 and 5, which detail the preparation of catalysts containing Pt/Rh weight ratios of 0.3, 0.8, 1.4, etc. It is taught that the honeycomb carrier is made of cordierite (column 5, lines 1-5). Examples detail the preparation of a catalysts containing 30 g/L

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(0.5 g/in³) of Sr and Ba, 2.0 g/L of Pt (56 g/ft³), and 0.1 g/L of Rh (2.8 g/ft³) (column 9 and Fig. 6).

It is taught that the over catalyst layer contains a binder material (column 4, lines 30-45 and column 5, lines 62-67). In an example, the content of the binder is 20% by weight of the over catalyst layer, which yields a loading rate of 4.2 g/L (0.068 g/in³) (the overlayer is 5% of the total 420 g/L) (column 5, lines 1-10 and lines 60-65).

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Kurokawa et al.

5. Claims 1-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Deeba et al.

Deeba et al. (US 2003/0100447) discloses a layered catalyst composition useful in the purification of exhaust gas. The catalyst composition comprises a carrier, a first layer deposited on the carrier, a second or middle layer deposited on the first layer, and a third or outer layer deposited on the second layer (0027).

With regards to the carrier, Deeba et al. teaches the use of a metal or ceramic honeycomb structure, made of a material such as cordierite or stainless steel (0028-0030).

With regards to the first layer, Deeba et al. teaches that the first layer comprises a high surface area support, such as gamma alumina, up to 30 g/ft³ of platinum, up to 0.75 g/in³ of an oxygen storage composition, up to 0.3 g/in³ of a stabilizer such as barium and/or strontium oxide, and up to 0.3 g/in³ of a promoter, including lanthanum oxide (0031-0032). The endpoints of the ranges disclosed by the reference are

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considered specific examples which anticipate the claimed ranges. In an example, Deeba et al. details the preparation of a catalyst containing 4.2% by weight barium oxide, which yields $0.08 \text{ g/in}^3 \text{ BaO}$ (page 5, Example 1).

Deeba et al. teaches that the second layer comprises a high surface area support, such as gamma alumina, $20\text{-}200 \text{ g/ft}^3$ of palladium, $0\text{-}10 \text{ g/ft}^3$ of palladium, up to 0.3 g/in^3 of a promoter, and up to 0.3 g/in^3 of a stabilizer (0033-0034). The third layer comprises a high surface area support, platinum and/or rhodium, and an oxygen storage component (0035). Platinum is containing in an amount in the range of $2\text{-}20 \text{ g/ft}^3$ and rhodium is containing in an amount in the range of $3\text{-}15 \text{ g/ft}^3$ (0036). With regards to the language of the claims, the combination of the second and third layers taught by the reference are considered to correspond to the topcoat instantly claimed (as defined in instant claim 13), with the second layer corresponding to the middle layer claimed herein and the third layer corresponding to the upper layer claimed herein. In an example, Deeba et al. teaches the preparation of a catalyst composition which contains a total weight ratio (i.e. second and third layer combined) of Pt to Rh of 0.67, which yields a molar ratio of 1.3. The total loading rates of the noble metals in the second and third layer is 58 g/ft^3 , which meets the range instantly claimed.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Deeba et al.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 12 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindner et al. as applied above for claims 1-2, 4-6, 8-11, 14-26, and 28-30.

The teachings of Linder et al. are as described above for claims 1-2, 4-6, 8-11, 14-26, and 28-30.

With regards to claim 12, the difference between the reference and the claims is that the reference does not disclose that the undercoat contains lanthanum oxide in a loading of 0.2 to 0.6 g/in³ of carrier. With regards to claim 27, the difference between the reference and the claims is that the reference does not disclose that the lanthanum oxide in the overcatalyst layer is present in an amount of 0.02 to about 0.5 g/in³ of carrier. However, Lindner et al. does teach that the lanthanum oxide serves to stabilize the aluminum oxide and to ensure a high heat resistance for the catalyst (page 5, lines 30-38), which suggests that the lanthanum oxide is an art recognized result effective variable. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215. In this case, one would have

been motivated to optimize the amounts of lanthanum oxide present in each of the layers in order to obtain a catalyst with improved heat resistance.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindner et al. as applied to claims 1-2, 4-6, 8-11, 14-26, and 28-30 above, and further in view of Wan.

The teachings of Lindner et al. are as described above for claims 1-2, 4-6, 8-11, 14-26, and 28-30 above.

The difference between the reference and the claims is that the reference does not disclose the use of a metal monolith comprising stainless steel, as required by claim 7.

Wan (US 5,057,483) discloses a layered catalyst composition useful in the purification of exhaust gases from internal combustion engines. Wan teaches that suitable carriers include honeycomb carriers made of a refractory ceramic material such as cordierite or a refractory metal such as stainless steel (column 4, line 65 – column 5, line 10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Lindner et al. to include the use of a stainless steel monolith in light of the teachings of Wan. Wan teaches that cordierite and stainless steel monolithic structures are functionally equivalent carrier compositions in the purification of exhaust gas. It would have been obvious to one of ordinary skill to substitute one known carrier for another functionally equivalent carrier. Because both

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carriers can be used in the purification of exhaust gases from internal combustion engines, one would have reasonable expectation of success from the combination.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurokawa et al. as applied to claims 1-6, 8-9, 14-21, 23, 28, and 30 above, and further in view of Wan.

The teachings of Kurokawa et al. are as described above for claims 1-6, 8-9, 14-21, 23, 28, and 30 above.

The difference between the reference and the claims is that the reference does not disclose the use of a metal monolith comprising stainless steel, as required by claim 7.

Wan (US 5,057,483) discloses a layered catalyst composition useful in the purification of exhaust gases from internal combustion engines. Wan teaches that suitable carriers include honeycomb carriers made of a refractory ceramic material such as cordierite or a refractory metal such as stainless steel (column 4, line 65 – column 5, line 10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Kurokawa et al. to include the use of a stainless steel monolith in light of the teachings of Wan. Wan teaches that cordierite and stainless steel monolithic structures are functionally equivalent carrier compositions in the purification of exhaust gas. It would have been obvious to one of ordinary skill to substitute one known carrier for another functionally equivalent carrier. Because both carriers can be used in the purification of exhaust gases from internal

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combustion engines, one would have reasonable expectation of success from the combination.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lindener et al. (US 6,348,430) is the US equivalent of EP 0 885 650. Williamson et al. (US 5,116,800), Takeshima et al. (US 5,702,675), Chen (2003/0021745), Nakamura et al. (US 2002/0091064), and Noda et al. (US 2003/0083197) all disclose layered catalyst compositions containing alkaline earth metals.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Ildebrando whose telephone number is (703) 305-0469. The examiner can normally be reached on Monday-Friday, 7:30-5, with Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.



Christina Ildebrando

Examiner

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7/7/03

CAI
July 7, 2003